



Extended Application for Nonprovisional Patent

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This is an application for a nonprovisional patent. The machine mentioned here will be known as a Rodent Euthanasia Machine. The model will be known as the R.E.M. 1.

The principle of operation is simple in nature. Carbon Dioxide enters the machine from a research or medical grade CO₂ source in the pressure range of 20 PSI to 150 PSI. The CO₂ is then regulated internally at approximately 15 PSI and delivered to a manifold with 2 solenoids. Each solenoid has its own flowmeter attached and the unit is constructed to have two regulated flow channels. The two channels are recombined to form one output connected to an output bulkhead connection. The solenoid time durations are controlled by a step timer. The output from the bulkhead fitting is then delivered to a nonsealed lid above the animal cage being utilized.

The program operation is also simple in nature. It contains 4 steps:

- Step 1 titrates carbon dioxide for a desired narcotic setpoint.
- Step 2 is the necessary wait time to insure narcosis properly sets in.
- Step 3 will then titrate carbon dioxide with the second flowmeter to cause a CO₂ level of almost 100 percent.
- Step 4 is then the wait time needed to insure nonreversible euthanasia.

As one can easily see flowmeter 1 is controlled by program step 1 and flowmeter 2 is controlled by program step 3. Setting flowmeter 1 at 2.0 LPM for 30 seconds achieves a 20% CO₂ level internal to the Thoren small mouse cage. Setting step 2 for a wait time of 15 seconds has yielded results with mice that appear to have no visible distress. This instrument is made to be versatile because many different size cages are used in the Research industry. Both time durations and flows can be preset by the operator to optimize the best conditions for their environment.

To start a sequence, a single momentary switch is depressed. This will both reset the device and start the program.

R.E.M. 1
CO2 Flow Diagram

